AMENDMENTS TO THE CLAIMS

Claim 1. (Previously Presented)

A communication network comprising:

a master device and a plurality of slave devices connected to each other through at least one multiplexer in a tree configuration with the master device at the vertex for transmitting and receiving various types of specific information having a fixed length to and from each ones of the plurality of slave devices; wherein

said master device specifies any of the slave devices via the multiplexer according to a round-robin polling order, the multiplexer includes a master destined information selecting unit and then

the specified slave device transmits the specific information for starting communications with the master device, the specific information being used for matching the sampling time in said master device and executes specific calculations according to the specified information for returning said specific information from said master device according to the specific information for starting;

wherein the delay time in transferring the specific information from the slave device through the at least one multiplexer to the master device and vice versa is controlled by the master destined information selecting unit so that the delay time is substantially constant from each relay point within the at least one multiplexer.

Claim 2. (Previously Presented)

The communication network according to claim 1; wherein each of said slave devices and said master device transmits general information sampled at each of the matched sampling times and having a fixed length in addition to the specific information for starting at a predetermined cycle and specific information for returning at a predetermined cycle.

Claim 3. (Currently Amended)

The communication network according to claim 2; wherein said multiplexer comprises:

a master-side port for connecting said master device thereto and slave-side ports for connecting the plurality of slave devices thereto for mutual communication;

a plurality of master-destined general information receiving units for receiving the general information from said slave-side ports;

a master-destined specific information receiving unit for receiving the specific information for starting from each of said slave-side ports and managing the specific information in batch;

a slave-destined broadcasting bus for broadcasting information obtained from said master-side port to all of said slave-side ports; and

a master-destined information multiplexing bus for outputting the information allowed by said master-destined information selecting unit to said master-side port; and wherein

the master-destined information selecting unit selects any one of said master-destined general information receiving units or said master-destined specific information receiving unit and allows output to said master device ~~according to a prespecified method~~ in a different manner according to whether the information from the slave-side ports is the general information or the specific information.

Claim 4. (Previously Presented)

The communication network according to claim 3 wherein said master-destined information selecting unit

allows output from said plurality of master-destined general information receiving units according to a round-robin when the specific information is not received from said slave-side port;

inhibits outputs of the specific information for a specified period of time decided by a time required for transmitting the information with a fixed length after start of input into said master-destined specific information receiving unit when the specific information is received from any of said slave-side ports; and further

inhibits new output from said plurality of master-destined general information receiving units for the specified period of time and allows output from said master-destined specific information receiving unit after passage of the specified period of time.

Claim 5. (Currently Amended)

The communication network according to claim 3; wherein each of said master device and said slave device comprises:

a general information transreceiving unit for transmitting or receiving the general information;

a specific information transreceiving unit for transmitting or receiving the specific information;

a transmission selecting unit for selecting any one of said general information transreceiving unit or said specific information transreceiving unit and allowing output therefrom ~~according to a prespecified method~~ in a different manner according to whether a transmission request is received from the general information transreceiving unit or from the specific information transreceiving unit; and

executes communications with said multiplexer to which it is connected via a transreceiving port.

Claim 6. (Original)

The communication network according to claim 5; wherein

said transmission selecting unit allows output from said general information transreceiving unit when a specific information sending request has not been received from said specific information transreceiving unit;

inhibits output from said specific information transreceiving unit only for a specified period of time required for transmission of the information with a fixed length after the request is received when the specific information sending request has been received from said specific information transreceiving unit; and further

inhibits new output from said general information transreceiving unit for the specified period of time and then allows output from said specific information transreceiving unit after passage of the specified period of time.

Claim 7. (Currently Amended)

The communication network according to claim 3; wherein said multiplexer unit comprises:

a slave-destined information receiving unit for receiving information from said master-sideport; and

a slave-destined information control unit for allowing output from said slave-destined information receiving unit ~~according to a prespecified method;~~ ~~and~~ after providing a delay, wherein

the slave-destined information control unit accumulates the general information or the specific information, when the general information or the specific information has been received from said master-side port, for a specified period of time decided by a period of time required for transmission of the information with a specified length after input into said slave-destined information receiving unit is started, and

outputs the accumulated information from said slave-destined information receiving unit after passage of the specified period of time.

Claim 8. (Currently Amended)

The communication network according to claim 3; wherein said multiplexer comprises:

a slave-destined ~~generation~~ general information receiving unit for receiving the general information from said master-side port;

a slave-destined specific information receiving unit for receiving the specific information from said master-side port; and

a slave-destined information selecting unit for selecting any one of said slave-destined general information receiving unit or said slave-destined receiving unit and allowing output to said slave devices ~~according to a prespecified method~~ in a different manner according to whether the general information is stored in the slave-destined general information receiving unit or

the specific information is stored in the slave-destined specific information receiving unit; wherein

said multiplexer allows output from said slave-destined general information receiving unit when the specific information has not been received from said master-side port;

said multiplexer inhibits output of the specific information when the specific information has been received from the master-side port for a specified period of time decided by a time required for transmission of the information with a fixed length after input to said slave-destined specific information receiving unit is started, and further

said multiplexer inhibits new output from said slave-destined general information receiving unit for the specified period of time and allows output from said slave-destined specific information receiving unit after passage of the specified period of time.

Claim 9. (Previously Presented)

The communication network according to claim 8; wherein said master device and each of said slave devices transmits management information with a fixed length to a target device at a predetermined cycle; and

said multiplexer further comprises:

a management information transreceiving unit for transmitting or receiving the management information; and

said plurality of master-destined information selecting units inhibit new output from said management information transreceiving unit for the specified period of time when the specified information has been received from any of said slave-side ports, and allows output from said master-destined specific information receiving unit after passage of the specified period of time, and further

said slave-destined information selecting unit inhibits new output from the management information transreceiving unit for the specified period of time when the specific information has been received from said master-side port, and allows output from said slave-destined specific information receiving unit after passage of the specified period of time.

Claim 10. (Previously Presented)

The communication network according to claim 8; wherein, at least one multiplexer is replaced with a second multiplexer constituting a small-scale communication network;

said at least one second multiplexer is connected via said multiplexer with said master device at the vertex, and one or more multiplexers are connected to each of said second multiplexer according to necessity with a plurality of said slave devices connected thereto in a tree configuration; and

each of said second multiplexers does not relay the specific information, and behaves as a slave device with respect to a master device at an upper level,

and also behaves as a master device with respect to each of the slave devices at a lower level;

said master device specifies said second multiplexer according to a round-robin polling order, and each of said second multiplexer transmits the specific information for starting communications with the master device, the specific information being used for matching the sampling time to said master device according to a specified order and executes a prespecified operation according to the specific information for returning said specific information from said second multiplexer in response to the specific information for starting and to match the sampling time; and further

each of said second multiplexer specifies each of said slave devices via said multiplexer according to a round-robin polling order, and each of said slave devices transmits information for starting and used for matching the sampling time to said second multiplexer via said multiplexer according to the specified order and also executes a specified operation according to the specific information for returning said specific information from said second multiplexer in response to the specific information for starting and to match the sampling time.

Claim 11. (Original)

The communication network according to claim 10; wherein said second multiplexer comprises:

a master-side specific information transreceiving unit for transmitting or receiving the specific information from said master-side port in place of said master-destined specific information receiving unit in said multiplexer; and

a slave-side specific information transreceiving unit for transmitting or receiving the specific information from said slave-side port in place of said slave-destined information receiving unit in said multiplexer.

Claim 12. (Original)

The communication network according to claim 11; wherein

said master-destined information selecting unit inhibits output from said master-side specific information transreceiving unit for the specified period of time when a specific information sending request has been received from said master-side specific information transreceiving unit; and

inhibits new output from said master-destined general information receiving unit for the specified period of time and allows output from said master-side specific information transreceiving unit after passage of the specified period of time; and

said slave-destined information selecting unit

inhibits output from said slave-side specific information transreceiving unit for the specified period of time when a specific information sending request has been received from said slave-side specific information transreceiving unit;

inhibits new output from said slave-destined general information receiving unit for the specified period of time and then allows output from said slave-side specific information transreceiving unit after passage of the specified period of time.

Claim 13. (Previously Presented)

The communication network according to claim 8; wherein, at least one packet multiplexer is replaced with a third multiplexer constituting a small-scale communication network;

at least one of said third multiplexers is connected thereto via said multiplexer with said master device at the vertex, and further a plurality of said slave devices are connected via said third multiplexer and one or more multiplexers according to necessity in a tree configuration with a second master device functioning as a master device in the small-scale communication network provided at the vertex;

said master device specifies each of said slave devices via said multiplexer and said third multiplexer according to a round-robin polling order, and each of said slave devices transmits the specific information for starting

and used for matching the sampling time to said master device according to the specified order, and executes a specified operation according to the specified information for returning said specified information from said master device in response to the specific information for starting and to match the sampling time.

Claim 14. (Original)

The communication network according to claim 13; wherein

said third multiplexer has a second master-side port for connecting said second master device thereto for mutual communications, and further comprises, in addition to components of the multiplexer,

a second master-side master-destined general information receiving unit for receiving the general information from said second master-side port to said master-side port;

a second master-side slave-destined general information receiving unit for receiving the general information from said second master-side port to said slave-side port;

a master-side second master-destined general information receiving unit for receiving the general information from said master-side port to said second master-side port;

a slave-side second master-destined general information receiving unit for receiving the general information from said slave-side port to the second master-side port;

a second master-destined information selecting unit for selecting any one of said master-side second master-destined general information receiving unit or said slave-side second master-destined general information receiving unit and allowing output therefrom; and

a second master-destined information multiplexing bus for outputting information allowed by said second master-destined information selecting unit to said second master-side port.

Claim 15. (Previously Presented)

The communication network according to claim 14; wherein said master-destined information selecting unit

inhibits outputs of the specified information for the specified period of time when the specific information has been received from any of said slave-side ports;

inhibits new output from a plurality of said master-destined general information receiving units as well as from said second master-side master-destined general information receiving unit for the specified period of time and allows output from said master-destined specific information receiving unit for passage of the specified period of time; and

said slave-destined information selecting unit

inhibits output of the specific information for the specified period of time when the specific information has been received from said master-side port;

inhibits new output from said slave-destined general information receiving unit as well as from said second master-side slave-destined general information receiving unit for the specified period of time and allows output from the slave-destined specific information receiving unit after passage of the specified period of time; and

said second master-destined information selecting unit allows output from said master-side second master-destined general information receiving unit as well as from said slave-side second master-destined general information receiving unit according to a round-robin.

Claim 16. (Previously Presented)

The communication network according to claim 13; wherein,

in place of said master device, there are provided:

a switch for switching the general information;

a third master device for transmitting or receiving the specified information; and

at least one fourth multiplexer connected to said switch; and

said third master device specifies each of said slave devices via said multiplexer, said fourth multiplexer, and said third multiplexer according to a

round-robin polling order, and then each of said slave devices transmits the specific information for starting used for matching the sampling time to said master device according to a specified order and executes a specified operation according to the specific information for returning returned from said master device in response to the specific information for starting to match the sampling time.

Claim 17. (Previously Presented)

The communication network according to claim 16; wherein said fourth multiplexer has a switch-side port for connecting the switch thereto to relay mutual communications, and comprises:

a switch-destined general information receiving unit in place of said plurality of master-destined general information receiving units for discretely receiving the general information from each of said slave-side ports;

a switch-side slave-destined general information receiving unit in place of said slave-destined general information receiving unit for receiving the general information from said switch-side port; and

a third master-destined information control unit for controlling said master-destined specific information receiving unit and allowing output to said third master device according to a specified method in place of said master-destined information selecting unit; and further comprises, in addition to components of the multiplexer,

a switch-destined information selecting unit for selecting one of said switch-destined information receiving units and allowing output therefrom.

Claim 18. (Previously Presented)

The communication network according to claim 17; wherein said master-destined information control unit

accumulates the specified information in said master-destined specific information receiving unit for the specified period of time when the specified information has been received from said slave-side port, and

outputs the specified information from said master-destined information receiving unit after passage of the specified period of time; and

said switch-destined information selecting unit allows output from said switch-destined general receiving unit according to a round-robin polling order; and

said slave-destined information selecting unit

inhibits output from said slave-destined specific information receiving unit for the specified period of time when the specific information has been received from said master-side port,

inhibits new output from said slave-destined general information receiving unit for the specified period of time, and

allows output from said slave-destined specific information receiving unit after passage of the specified period of time.

Claim 19. (Previously Presented)

The communication network according to claim 13; wherein,

in place of said master device, there are provided:

a switch for switching the general information and the specific information; and

a third master device for transmitting or receiving the specific information; and

said third master device specifies each of said slave devices via said switch, said multiplexer, and said third multiplexer according to a round-robin polling order, and then each of said slave devices transmits specific information for starting used for matching the sampling time to said master device and executes a specified operation according to the specific information for returning returned from said master device according to the specific information for starting to match the sampling time.

Claim 20. (Original)

The communication network according to claim 19; wherein

said switch comprises a switching unit for outputting information allowed by said master-destined information control unit to a slave-side port as an destination in place of said a slave-destined general information receiving unit, said master-side second master-destined general information receiving

unit, said second master-side master-destined general information receiving unit, said second master-side slave-destined general information receiving unit, said master-destined general information receiving unit, said second master-side port, said broadcasting bus, said multiplexing bus, and said second master-destined information multiplexing bus in said third multiplexer.

Claim 21. (Original)

The communication network according to claim 20; wherein

said master-destined information control unit

accumulates the specified information in said master-destined specific information receiving unit for the specified period of time when the specified information has been received from said slave-side port and outputs the specific information from said master-destined specific information receiving unit after passage of the specified period of time; and said second master-destined information selecting unit

inhibits output from said slave-destined specific information receiving unit for the specified period of then when the specific information has been received from said master-side port;

inhibits new output from said second master-destined general information receiving unit for the specified period of time and allows output from said slave-destined specific information receiving unit after passage of the specified period of time.

Claim 22. (Previously Presented)

The communication network according to claim 4; wherein information transmitted from or received by each device is variable in the length, and

the specified period of time during which output of the specific information from each device is inhibited is restricted within a time frame decided by a time prespecified for transmitting information with the maximum length.